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M1 - [03] L811 L814 L815 L818 L831 L832 M423 M431 M782 M903 P714 Q211 R022
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M2 - [01] D012 D016 D023 D024 D025 D120 H4 H401 H441 H8 M210 M211 M225 M232
M240 M283 M320 M412 M431 M511 M520 M530 M540 M782 M903 P714 Q211 R022
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H481 H482 H483 H5 H521 H8 J0 J012 J2 J221 J222 J271 J272 K0 L8 L814
L818 L822 L831 M1 M126 M141 M210 M211 M213 M232 M262 M282 M311 M323
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M3 - [02] D012 D016 D023 D024 D025 D120 H4 H401 H441 H8 M210 M211 M225 M232
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- [04] F012 F013 F014 F015 F016 F017 F019 F113 F123 H4 H405 H423 H424
H481 H482 H483 H5 H521 H8 J0 J012 J2 J221 J222 J271 J272 K0 L8 L814
L818 L822 L831 M1 M126 M141 M210 M211 M213 M232 M262 M282 M311 M323
M342 M373 M393 M413 M431 M510 M522 M530 M540 M782 M903 P714 Q211 R022
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PA - (TAIC) TAIYO CHEM IND CO LTD
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XIC - A23L-001/00 ; A23L-002/00 ; A61K-031/71 ; B01J-013/00
AB - J59210024 Compsn. is prepd. by emulsifying mixt. of tocopherol and
sugar ester (1-60 wt. pts.) and gum arabic soln. (99-40 wt. pts.).
Sucrose acetate isobutylate (0.3-40 wt. pts.) is used as sugar ester
and tocopherol is natural tocopherol.
- USE/ADVANTAGE - Emulsifying tocopherol and gum arabic soln. gives
tocopherol emulsion easily dispersed into drink. Making mixt. of
tocopherol and sucrose acetate isobutylate and adjusting its gravity
gives long term stable tocopherol emulsion. This emulsion is useful as
vitamin E material or to increase visual value of drinks.(0/0)
IW - EMULSION TOCOPHEROL CONTAIN HEALTH DRINK OBTAIN EMULSION MIXTURE
TOCOPHEROL SUGAR ESTER GUM ARABIC SOLUTION
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TOCOPHEROL SUGAR ESTER GUM ARABIC SOLUTION
NC - 001
OPD - 1983-05-13
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PAW - (TAIC) TAIYO CHEM IND CO LTD
TI - Emulsified tocopherol-contg. health drink - obt'd. by emulsifying mixt.
of tocopherol, sugar ester and gum arabic soln.

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- (54) Title of the Invention: **Tocopherol Emulsion**
- (21) Application No.: 58-84542
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SPECIFICATION**1. Title of the Invention**

Tocopherol Emulsion

2. Claims

(1) An emulsified composition obtained as a result of the emulsification of 1 to 60 weight parts of a mixture of tocopherol and sugar ester with 99 to 40 weight parts of an aqueous solution of gum arabic.

(2) The emulsified composition according to claim (1), wherein 0.3 to 40 weight parts of sucrose acetate isobutyrate is used as the sugar ester.

(3) The emulsified composition according to claim (1), wherein natural tocopherol is used as the tocopherol.

3. Detailed Description of the Invention

The present invention relates to an emulsified composition used for a health beverage, characterized in binding tocopherol and sucrose acetate isobutyrate or another sugar ester with gum arabic.

The vitamin E homologue tocopherol includes α -, β -, γ -, and δ -tocopherol, and synthetic tocopherol is racemic, shows no optical activity, and consists of a mixture of eight types of diastereomers. Natural tocopherols are optically active, their strength of vitamin E activity increases in order from α to δ , and not only do these tocopherols possess important action in deterring the onset of impotence due to vitamin E deficiency, muscle deterioration, hemolysis of red blood cells, anemia, and the like, but they also act as biological antioxidants for prolonging the presence of vitamins A and C in the body, which are considered to play an important role in maintaining health, and when unsaturated fatty acid intake is high, oxidative decomposition in the intestines and cells is prevented as a result of taking vitamin E, and by means of other effects whereby blood clotting is prevented and blood clots are dissolved, the body is kept youthful, fatigue is alleviated, the lungs are protected from atmospheric pollutants, diuretic effects whereby blood pressure is lowered, and other effects are obtained.

Health food-oriented products in particular have recently become more generally accepted amid the upsurge of novelties for health maintenance/enhancement in aspects of diet as well, demand for health-oriented food products is increasing, so-called health drinks to which vitamins are added are being manufactured, and there has also been a significant demand for diversification and development in the field of health drinks.

When tocopherol, a fat-soluble vitamin, is added to a drink, it must be dispersed in the drink by means of an emulsification or the like. Usually, when tocopherol is added as an emulsified solution using an emulsifier or the like, separation occurs due to the specific gravity of the tocopherol being smaller than the specific gravity of the drink. In order to minimize such separation and evenly disperse the tocopherol, a method is conventionally employed whereby

50% or more of sugar is added to increase the viscosity. However, this method has drawbacks in that the drink is too sweet to drink undiluted and is difficult to drink because of its high viscosity, and although the product is usually diluted with water when used, it is not preferred by consumers who require limited sugar intake, and its use is limited in cases when the object is to provide a low-calorie health drink. Adding tocopherol in this manner to a drink that is meant for direct consumption without dilution is not known to be performed in drinks that do not contain milk protein, soymilk protein, or other types of protein. Also, emulsifiers are usually added in drinks that do not contain protein in order to enhance visual attractiveness and the like.

The inventors conducted research aimed at developing a new idea whereby the above-mentioned drawbacks are overcome, the effects of adding tocopherol for use in a drink are obtained simultaneously with the effects of an emulsifier, and a health drink emulsifier is developed that is stable when added to a drink.

As a result, the tocopherol emulsion of the above-mentioned object was able to be obtained, and the present invention could be developed by means of binding tocopherol and sucrose acetate isobutyrate with an aqueous solution of gum arabic as a result of the skillful use of a commonly known technique whereby orange oil is mixed with sucrose acetate isobutyrate and the specific gravity thereof is adjusted, and the resulting mixture is emulsified with an aqueous solution of gum arabic.

The present invention consists of an emulsifier for a tocopherol-containing health drink, characterized in that sucrose acetate isobutyrate or another sugar ester is added to tocopherol and the specific gravity thereof is adjusted, and the mixture is emulsified with an aqueous solution of gum Arabic; and it is an object of the present invention to provide an emulsifier for a natural tocopherol-containing health drink, having the effects of an emulsifier, whereby tocopherol is evenly dispersed as a result of adding the emulsifier to a drink.

Specifically, a tocopherol emulsion is obtained that can easily be dispersed in a drink by means of mixing and emulsifying tocopherol with an aqueous solution of gum arabic. The inventors furthermore discovered that a tocopherol emulsion with long-term stability in a drink is obtained by means of a process whereby a mixture is made of tocopherol and sucrose acetate

isobutyrate at an arbitrary ratio, the specific gravity thereof is appropriately adjusted, and the product is mixed and emulsified with an aqueous solution of gum arabic.

These emulsions are effective for use in drinks that do not require long-term stability and are adjusted at the time of drinking, or as vitamin E starting materials used in bottled, canned, or other drinks in which emulsification must be stable over a long period, and in which there must be no ring formation or settling; these emulsions are also useful as emulsifiers for enhancing the visual attractiveness of a drink.

The tocopherol used in the present invention may be an α -, β -, γ -, or δ -tocopherol, or any mixture thereof.

Alternatively, either a synthetic tocopherol or natural tocopherol may be used. The tocopherol used in the present invention may also be a product in which animal and vegetable oils are mixed in the tocopherol starting material.

The tocopherol is added in a ratio of 60 wt% or less with respect to the emulsion. The O/W-type emulsification required for dispersion in a drink for which the present invention is intended is not obtained when the added ratio of tocopherol is over 60 wt% ("wt" is omitted hereinafter).

The concentration of the aqueous solution of gum arabic is preferably 60% or less of gum arabic. When the concentration is over 60%, the viscosity of the aqueous solution of gum arabic is high, and the solution becomes difficult to adjust.

The aqueous solution of gum arabic is used in a ratio of 40% or higher in the emulsion. When this ratio is less than 40%, stable O/W-type emulsification is not obtained, or the resultant emulsion is poorly dispersed in the drink.

Sucrose acetate isobutyrate is added in a ratio of 0.3 to 40% in the emulsion. At this time, it is added so that the sum including the tocopherol content in the emulsion does not exceed 60%. If the sucrose acetate isobutyrate content exceeds 40%, or if the sum including the tocopherol concentration exceeds 60%, it will be difficult to obtain stable O/W-type emulsification.

Other than the above-mentioned composition of the present invention, sugars, preservatives, acidifiers, and flavorings may also be optionally used for purposes of seasoning and preservation.

Products with a wide range of viscosities can be selectively emulsified as a result of using a homomixer, pressure homogenizer, barrel homogenizer and the like according to the viscosity of the emulsion during emulsification and by means of selecting strong physical stirring and kneading operations.

Working examples will be cited hereinafter to describe specific examples of the present invention.

Working Example 1

An emulsified fluid was prepared with the help of the usual method from the components shown in Table 1, the product was added in a ratio of 5% to clear apple juice prepared with a specific gravity of 1.03 (20°C), the product was bottled, then heat-sterilized for ten minutes at 85°C, and the resultant product was stored for seven days at 37°C.

When observed with the unaided eye, the product had a uniformly milky color and no apparent abnormalities.

Table 1

Component	Added quantity (%)
Natural vitamin E 80% solution	7.00
Sucrose acetate isobutyrate	8.00
Gum arabic	25.00
Water	54.95
70% sorbitol solution	5.00
Benzoic acid	0.02
Citric acid	0.03

Working Example 2

An emulsified fluid was prepared with the help of the usual method from the components shown in Table 2, the product was added in a ratio of 10% to sparkling apple juice prepared with a specific gravity of 1.068 (20°C), the product was bottled, then heat-sterilized for five minutes at 90°C, and the resultant product was stored for ten days at 37°C.

When observed with the unaided eye, the product had a uniformly milky color and no apparent precipitates or suspended solids on the fluid surface.

Table 2

Component	Added quantity (%)
Natural vitamin E 80% solution	4.60
Sucrose acetate isobutyrate	10.00
Gum arabic	25.00
Water	55.35
70% sorbitol solution	5.00
Benzoic acid	0.02
Citric acid	0.03

As is apparent from the working example described above, the tocopherol emulsion of the present invention shows a uniform emulsification even when added to a drink.

The emulsifier for a health drink characterized in that tocopherol is mixed with sucrose acetate isobutyrate or another sugar ester and emulsified with an aqueous solution of gum arabic in this manner enables tocopherol to be easily and uniformly added to a health drink while obtaining the effects of an emulsifier, and is therefore considered to be useful for a health image drink that is suited to the needs of the consumer.

Applicant: Taiyo Kagaku Co., Ltd.